

# Chapter 11

## ***Intersection Studies***



# Intersection Studies

- Identification of crashes at intersections based on the specified county, dates, Y-line, and intersecting route combinations
- All route combinations must be entered
- All intersection studies are combination dependant
- Milepost information is not necessary to identify crashes at intersections

# Standard Parameters

## General Intersection Studies:

Date range = 3 years

Y-line = 150 feet

## Fatal Intersection Studies:

Date range = 5 years

Y-line = 150 feet

(allows for broader information - especially on rural roads)

## Pedestrian and/or Bicycle Intersection Studies:

Date range = 10 years

Y-line = 50 feet

(smaller subset of data; captures parallel crosswalk areas)

(can compare to HSIP safety warrants)

# Standard Parameters (Cont.)

## Highway Safety Improvement Program (HSIP) Intersection Studies:

Date range = 5 years

Y-line = 150 feet

(allows for a comparison with safety warrants)

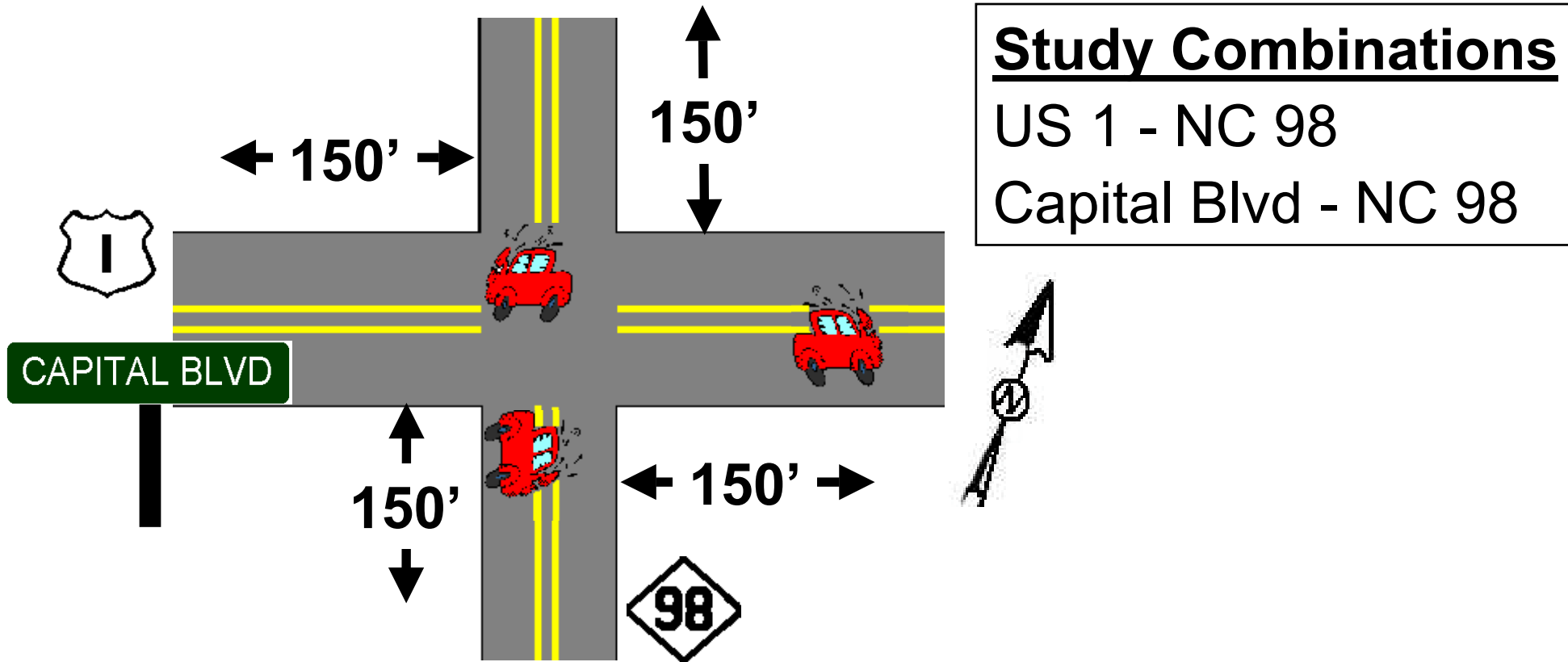
## Interchange Studies:

Date range = 3 years

Y-line depends on the length of the ramps and what location is being studied (bridge, underpass, ramps, etc.)

(interchanges can be studied as two strips)

# Intersections - Combination Dependant



The following reported crashes would be included in a study of US 1/Capital Blvd and NC 98 (150 foot Y-Line):

<u>ON RD</u>	<u>FROM RD</u>	<u>FROM DIST</u>	<u>FROM DIR</u>
Capital Blvd	NC 98	0 ft	
NC 98	US 1	10 ft	S
US 1	NC 98	150 ft	E

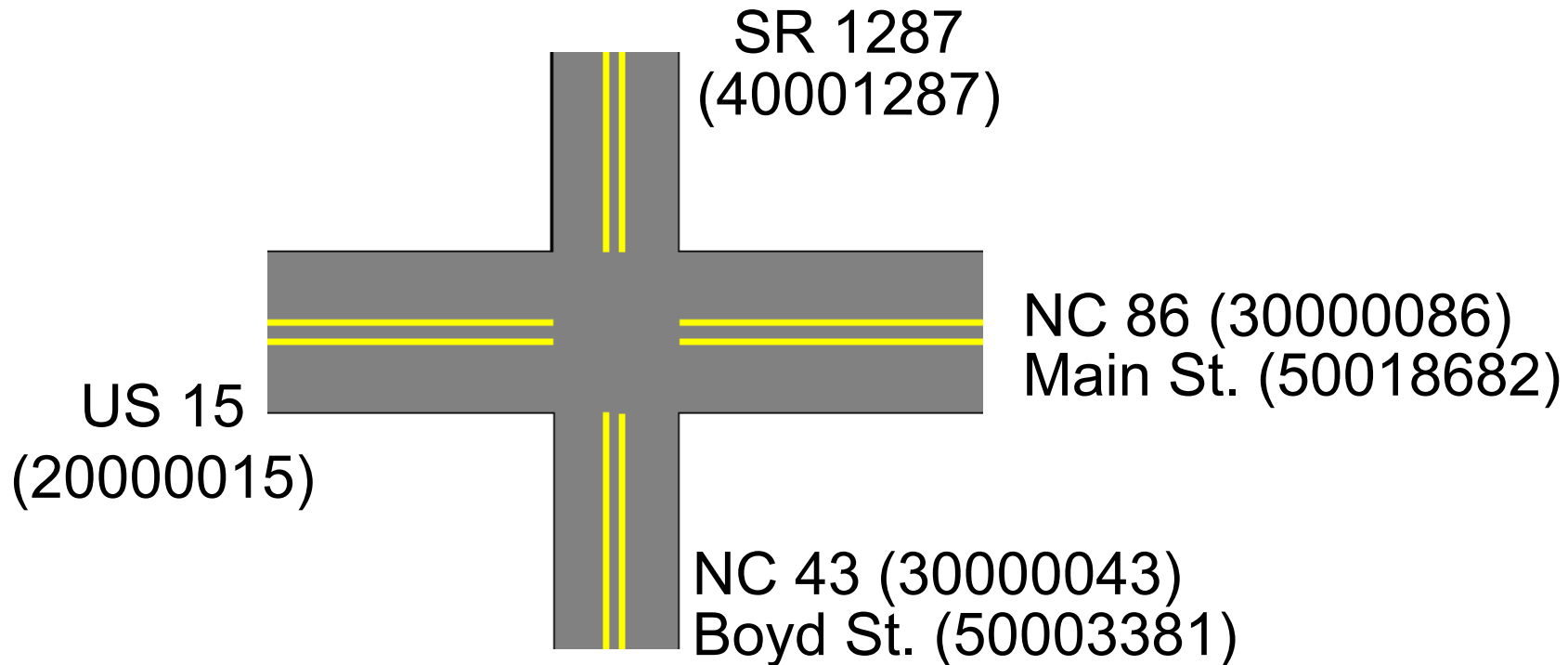
# Intersection Identification

- Crashes at intersection locations are identified by route **COMBINATIONS** (not mileposts)!
- When performing an intersection study, it is necessary to determine all possible combinations of intersecting routes (therefore, it is important to know all of the possible names of routes).
- It is imperative to list every possible combination (no matter how unlikely).

## Intersection Identification (Cont.)

- Get the mileposting for your intersecting routes (and all coinciding routes).
- Crashes are identified by the route combinations!
- Beware of loop locations!

# Intersection Combination Example



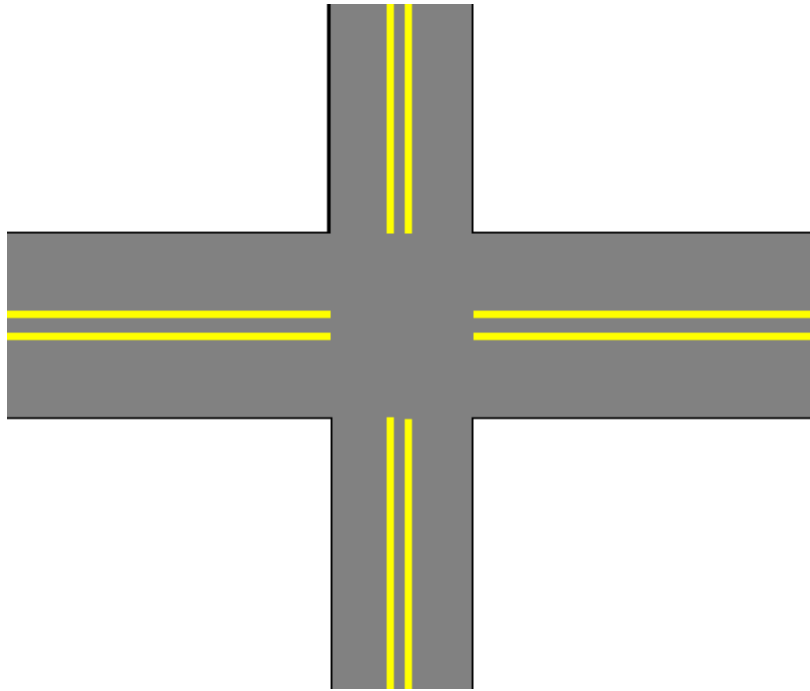
## **COMBINATIONS**

- |                        |                         |
|------------------------|-------------------------|
| 1. 20000015 - 40001287 | 8. 40001287 - 30000043  |
| 2. 20000015 - 30000086 | 9. 40001287 - 50003381  |
| 3. 20000015 - 50018682 | 10. 30000086 - 30000043 |
| 4. 20000015 - 30000043 | 11. 30000086 - 50003381 |
| 5. 20000015 - 50003381 | 12. 50018682 - 30000043 |
| 6. 40001287 - 30000086 | 13. 50018682 - 50003381 |
| 7. 40001287 - 50018682 |                         |



# Intersection Combination Exercise

US 401 (20000401)



Old Wake Forest Rd  
(50009210)

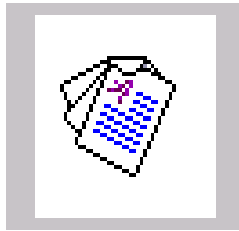
US 1 (20000001)  
Capital Blvd (50004906)

## COMBINATIONS

- 1.
- 2.
- 3.
- 4.
- 5.

# Intersection Study Screen

- Access the “Intersection Analysis Report” screen by selecting the following:



Intersection Study Report

- Consists of 3 tabs within the screen:
  - **Study Information** - allows for entry of general study information
  - **Road Identification** - allows the User to specify the road combinations
  - **Accident Adjustments** - allows the User to include or exclude crashes

# Study Information Tab

The screenshot shows a software window titled "TEAAS - Reports - Intersection Analysis". It has a menu bar with "Edit" and "Help", and a toolbar with icons for file operations and navigation. The main area is divided into three tabs: "Study Information", "Road Identification", and "Accident Adjustments". The "Study Information" tab is active and contains several sections:

- Save As**: A button.
- Study Area**:
  - Study Name**: A text input field.
  - Location Text**: A large text area.
  - County**, **Division**, and **Municipality**: Three dropdown menus. The "Municipality" dropdown is currently set to "All and Rural".
  - Y-Line Feet**, **Begin Date**, **End Date**, and **Years**: Four input fields. "Y-Line Feet" is set to "150".
  - ADT**, **ADT Route**, **K/A Coeff.**, and **B/C Coeff.**: Four input fields. "K/A Coeff." is set to "76.8" and "B/C Coeff." is set to "8.4".
  - Log No.**, **PH No.**, and **TIP No.**: Three input fields.
- Request Information**:
  - Received** and **Courier Service**: Two input fields.
  - Requested By**: A large text area.
  - Phone**, **Phone Ext.**, and **Fax**: Three input fields.
- Last Update**:
  - User ID**: An input field.
  - Date/Time**: An input field.

At the bottom of the window is a navigation bar with left and right arrow buttons, a page indicator showing "0 of 0", and additional navigation buttons.

See Chapter 10  
for information  
on this screen.

# Road Identification Tab

TEAS - Reports - Intersection Analysis

Edit Help

Study Information Road Identification Accident Adjustments

Log No.

Generate Fiche Generate Study

Road 1 (Fiche Road)

Lookup Validate Codes/Names

Table Input

Submit

Road Code Road Name

Intersection Road Combinations

Lookup Validate Codes/Names

Table Input

Submit

Road Name Road Code Road Code Road Name

0 of 0

Enter the “main” route and all coinciding routes and click the **“Validate Codes/Names”** button

Road “A” name

Road “A” 8-digit code

Road “B” name

Road “B” 8-digit code

**Remember - use caution when using the “Lookup” button!**

# Road Combinations

1. At least one road combination must be specified!
2. To enter a combination of “A” and “B”...
  - For road “A”, enter a road name of up to 25 alphanumeric characters **OR** enter a valid 8-digit code.
  - For road “B”, enter a road name of up to 25 alphanumeric characters **OR** enter a valid 8-digit code.
  - Click the “**Submit**” button
  - Repeat this process to input additional combinations
3. Click the “**Validate Codes/Names**” button to determine the 8-digit codes for entries with only road names

# Road Combinations (Cont.)

- **To delete a combination:**

- Highlight the row
- Click the “**Delete**” key

Remember - use caution  
when using the  
“Lookup” button!

- **To modify a combination:**

- Highlight the row
- Click the “**Enter**” key
- Edit record in the input section
- Click the “**Submit**” button

- **To identify local names for secondary roads:**

- Click the “**Lookup**” button
- Highlight the name of the roads you want to include
- Click the “**Include**” button
- Modify rows from included local names to show intersecting routes

# Road Combinations Example

TEAAS - Reports - Intersection Analysis

Edit Help

Study Information Road Identification Accident Adjustments

Log No.

Generate Fiche Generate Study

Road 1 (Fiche Road)

Lookup Validate Codes/Names

Table Input

Submit

Road Code	Road Name
30000032	NC 32
50032162	WASHINGTON
20000064	US 64
40001357	SR 1357

Intersection Road Combinations

Lookup Validate Codes/Names

Table Input

Submit

Road Name	Road Code	Road Code	Road Name
US 64	20000064	30000032	NC 32
US 64	20000064	50032162	WASHINGTON
US 64	20000064	40001357	SR 1357
NC 32	30000032	50032162	WASHINGTON
NC 32	30000032	40001357	SR 1357

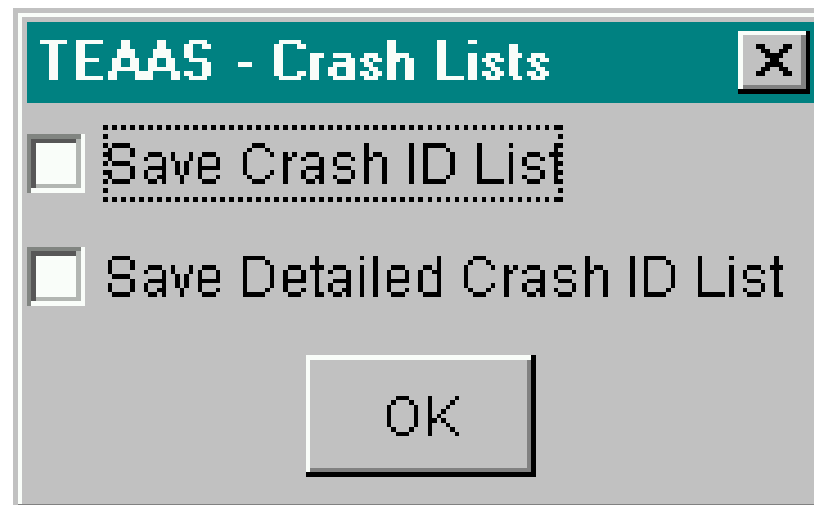
2 of 2

“Main” route and all  
coinciding routes

Combinations

# Road Identification Tab (Cont.)

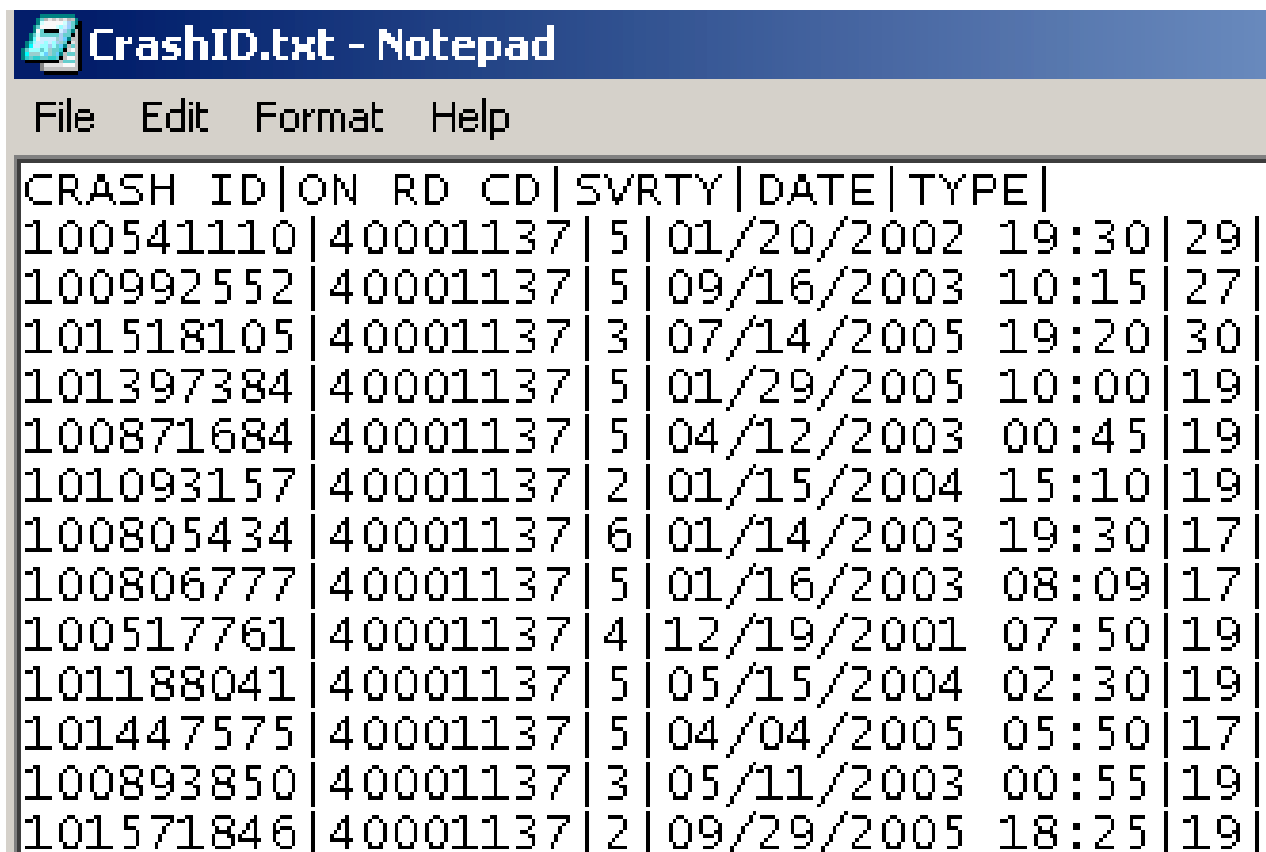
- Click on the “**Generate Study**” button to run an intersection study based on the study criteria.
- A dialog box will prompt users to save a “Crash ID List” (crash level information) or a “Detailed Crash ID List” (person level information). Select the output option (if desired) and click the “**OK**” button. If selected, this information will be saved as a text file.





# Crash ID List

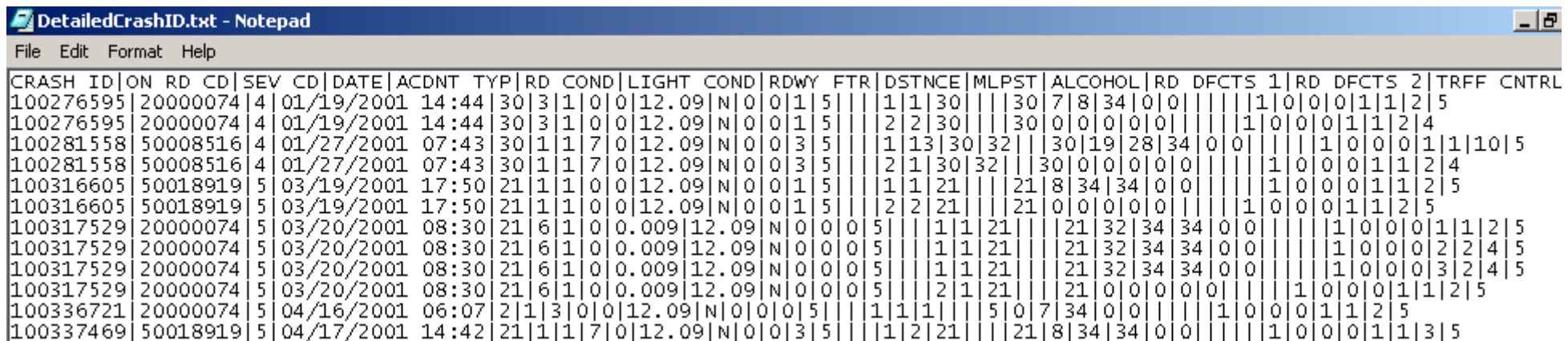
- This text file contains 5 columns of crash-level crash data.
- It may be imported into Excel or Access for further review.



CRASH ID	ON RD CD	SVRTY	DATE	TYPE
100541110	40001137	5	01/20/2002 19:30	29
100992552	40001137	5	09/16/2003 10:15	27
101518105	40001137	3	07/14/2005 19:20	30
101397384	40001137	5	01/29/2005 10:00	19
100871684	40001137	5	04/12/2003 00:45	19
101093157	40001137	2	01/15/2004 15:10	19
100805434	40001137	6	01/14/2003 19:30	17
100806777	40001137	5	01/16/2003 08:09	17
100517761	40001137	4	12/19/2001 07:50	19
101188041	40001137	5	05/15/2004 02:30	19
101447575	40001137	5	04/04/2005 05:50	17
100893850	40001137	3	05/11/2003 00:55	19
101571846	40001137	2	09/29/2005 18:25	19

# Detailed Crash ID List

- This text file contains 43 columns of person-level crash data.
- It may be imported into Excel or Access for further review.



DetailedCrashID.txt - Notepad

File Edit Format Help

CRASH ID	ON RD CD	SEV CD	DATE	ACDNT TYP	RD COND	LIGHT COND	RDWY FTR	DSTNCE	MLPST	ALCOHOL	RD DFCTS 1	RD DFCTS 2	TRFF CNTRL
100276595	20000074	4	01/19/2001	14:44	30 3	1 0 0	12.09	N 0 0	1 5	1 1 30	7 8 34	0 0	1 0 0 0 1 1 2 5
100276595	20000074	4	01/19/2001	14:44	30 3	1 0 0	12.09	N 0 0	1 5	2 2 30	0 0 0 0 0 0	1 0 0 0 1 1 2 4	
100281558	50008516	4	01/27/2001	07:43	30 1	1 7 0	12.09	N 0 0	3 5	1 13 30 32	30 19 28 34	0 0	1 0 0 0 1 1 10 5
100281558	50008516	4	01/27/2001	07:43	30 1	1 7 0	12.09	N 0 0	3 5	2 1 30 32	30 0 0 0 0 0	1 0 0 0 1 1 2 4	
100316605	50018919	5	03/19/2001	17:50	21 1	1 0 0	12.09	N 0 0	1 5	1 1 21	21 8 34 34	0 0	1 0 0 0 1 1 2 5
100316605	50018919	5	03/19/2001	17:50	21 1	1 0 0	12.09	N 0 0	1 5	2 2 21	21 0 0 0 0 0	1 0 0 0 1 1 2 5	
100317529	20000074	5	03/20/2001	08:30	21 6	1 0 0	0.009	12.09	N 0 0 0 5	1 1 21	21 32 34 34	0 0	1 0 0 0 1 1 2 5
100317529	20000074	5	03/20/2001	08:30	21 6	1 0 0	0.009	12.09	N 0 0 0 5	1 1 21	21 32 34 34	0 0	1 0 0 0 2 2 4 5
100317529	20000074	5	03/20/2001	08:30	21 6	1 0 0	0.009	12.09	N 0 0 0 5	2 1 21	21 0 0 0 0 0	1 0 0 0 1 1 2 5	
100336721	20000074	5	04/16/2001	06:07	2 1 3	0 0 0	12.09	N 0 0 0 5	1 1 1	5 0 7 34	0 0	1 0 0 0 1 1 2 5	
100337469	50018919	5	04/17/2001	14:42	21 1	1 7 0	12.09	N 0 0 3 5	1 2 21	21 8 34 34	0 0	1 0 0 0 1 1 3 5	

# Accident Adjustments Tab

- Allows users to edit (add or delete) crashes.
- Click the “**Generate Lists**” button to populate the data.

“**Generate Lists**” button

“Included Accidents” table

“Study Accidents List” table

The screenshot shows the 'Accident Adjustments' tab in the TEAAS software. The window has a menu bar with 'Edit' and 'Help'. Below the menu bar is a toolbar with icons for file operations and navigation. The main area is divided into several sections:

- Study Information**: A tab labeled 'Log No.' with a text input field.
- Generate Lists**: A button located below the 'Log No.' field.
- Generate Study**: A button located to the right of the 'Generate Lists' button.
- Included Accidents**: A section containing a table with a 'CrashID' header. To the right of the table is a 'Table Input' section with a text input field, a 'Submit' button, and instructions: 'Include additional accidents by entering the CrashID number here, using the Include button to the left, or by importing a list.' Below this are 'Import List' and 'Sort' buttons.
- Fiche Minus Study Accidents List**: A section containing a table with a 'CrashID' header. To the left of the table is a text area with instructions: 'These accidents appear in the Fiche Report, but do not currently appear in the study. Select those you want to include.' Below this is an 'Include <' button.
- Study Accidents List**: A section containing a table with a 'CrashID' header. To the right of the table is a text area with instructions: 'These accidents appear in the study based on given criteria. Select those that you want to exclude from the study.' Below this is an 'Exclude >' button.
- Excluded Accidents**: A section containing a table with a 'CrashID' header. To the left of the table is a text area with instructions: 'These accidents initially appeared in the study, but will be excluded from the next generated study.'

At the bottom of the window is a status bar with navigation buttons and a page indicator showing '0 of 0'.

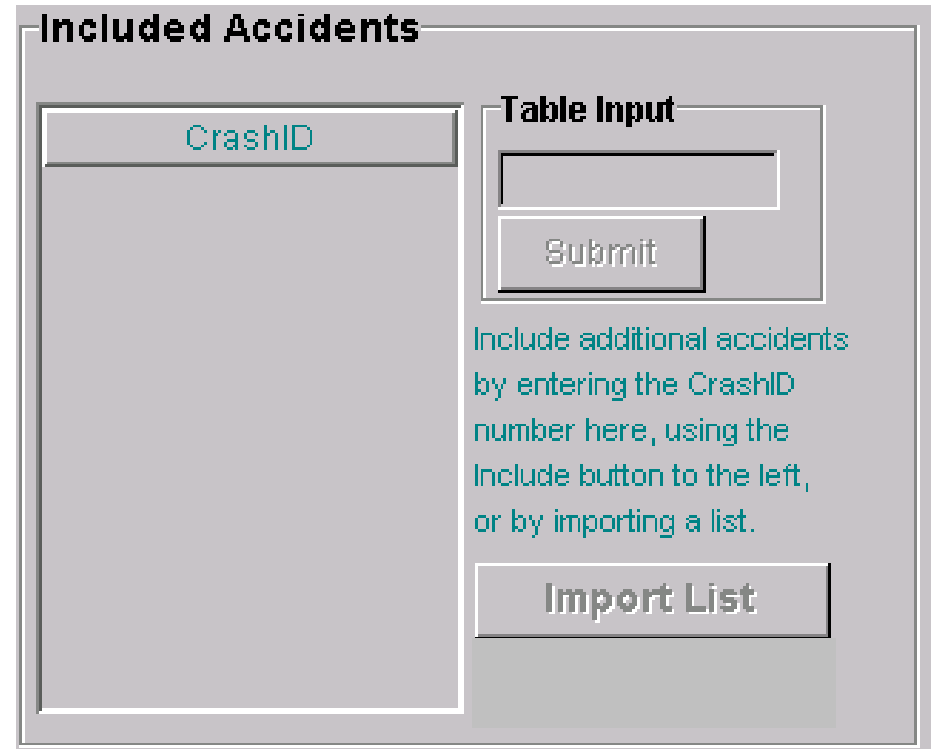
“Fiche Minus Study Accidents List” table

“Excluded Accidents” table

# Included Accidents

Crashes added to the study by:

- 1) Including crashes from the “Fiche Minus Study Accidents” table
- 2) Entering a Crash ID into the “Table Input” section and clicking the “**Submit**” button



The screenshot shows a web interface titled "Included Accidents". On the left is a large, empty table with a header labeled "CrashID". To the right of the table is a section titled "Table Input" which contains a text input field and a "Submit" button. Below the "Table Input" section is a text instruction: "Include additional accidents by entering the CrashID number here, using the Include button to the left, or by importing a list." At the bottom right of the interface is a button labeled "Import List".

- 3) Clicking the “**Import List**” button to import a text file containing Crash IDs

To remove crashes from this table:

Highlight the Crash ID and click the “**Delete**” key (multiple records may be highlighted using the “**Ctrl**” or “**Shift**” keys)

# Fiche Minus Study Accidents List

- Crashes appearing in this table are contained within the fiche report but have not been included in the study.

**Fiche Minus Study Accidents List**

These accidents appear in the Fiche Report, but do not currently appear in the study. Select those you want to include.

**Include** ◀

CrashID
96000576
96001510
96003594
96005150
96005763
96005764
96007897
96009765
96011815

- To include crashes from this table into study:
  - Highlight the Crash ID
  - Click the “**Include**” button
  - Highlight multiple records using the “**Ctrl**” or “**Shift**” keys.

# Study Accidents List

- Crashes appearing in this table are in the study but may or may not be on the fiche report.

**Study Accidents List**

CrashID
96012587
96019588
96022369
96041755
96044495
96051308
96051843
96095531

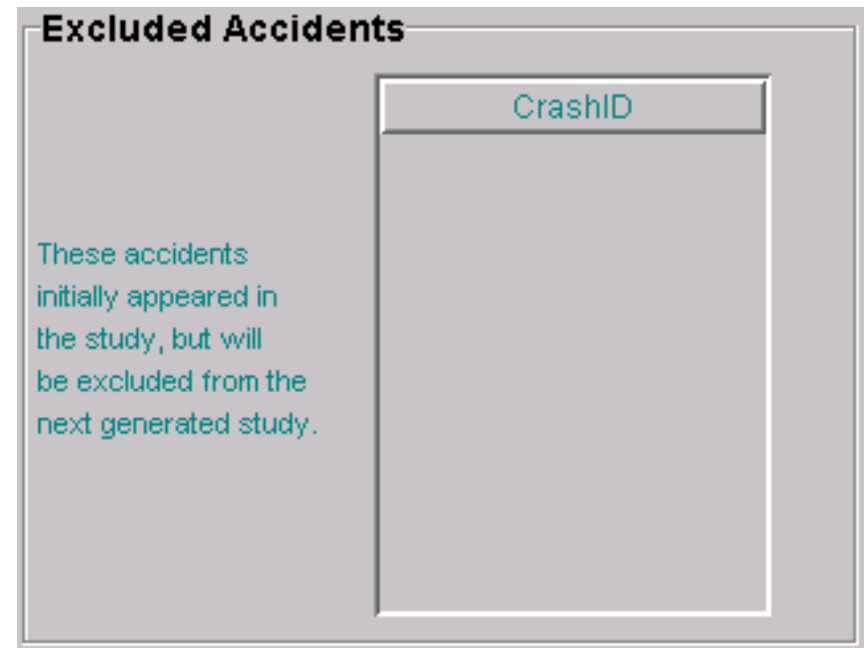
These accidents appear in the study based on given criteria. Select those that you want to exclude from the study.

**Exclude ►**

- To exclude crashes from the study:
    - Highlight the Crash ID and click the **“Exclude”** button
    - Highlight multiple records with the **“Ctrl”** or **“Shift”** keys
- (Excluded crashes are moved to the “Excluded Accidents” table.)

# Excluded Accidents

- Can only be populated by excluding crashes from the “Study Accidents List” table



- To delete crashes from this panel
  - Highlight the Crash ID
  - Click the “**Delete**” key
  - Highlight multiple records using the “**Ctrl**” or “**Shift**” keys

# Intersection Studies - Steps

- 1) Determine the location and reason for the study
  - Review maps
  - Run feature report(s)
  - Determine all Intersection Combinations
  - Determine or calculate traffic volumes (AADTs)
- 2) Enter study criteria
- 3) Generate a fiche report
- 4) Generate the initial study
- 5) Evaluate the fiche report and compare it with the initial study to determine if any crashes need to be added or deleted
- 6) Add or delete crashes on the study in the “Accident Adjustments” tab
- 7) Generate the final study



# Intersection Study Example

Suppose you perform an intersection study on the intersection of US 64 at NC 32 in Washington County from 1/1/1996 through 12/31/1999 with a Y-Line of 150 feet.

Step A - Review maps (county, city, traffic volumes, etc.)

Step B - Run features report(s)



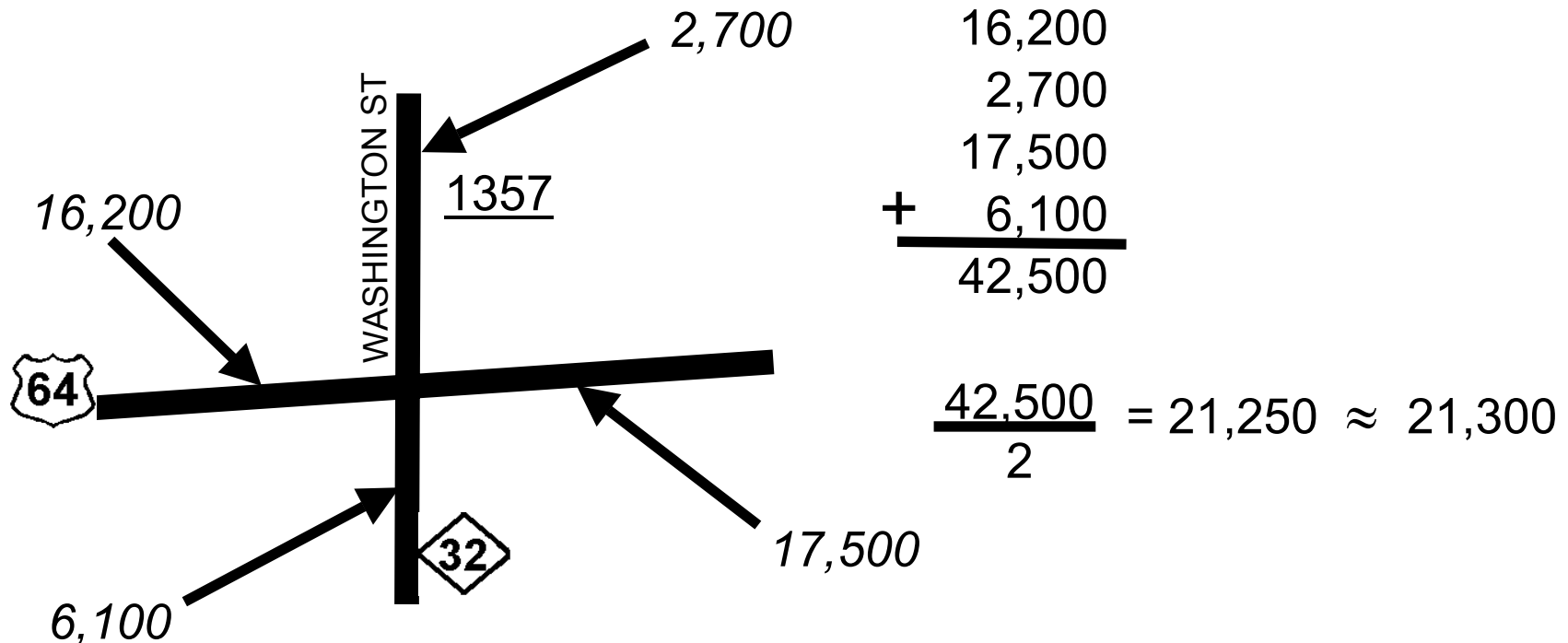
Hint: after reviewing maps and other information it was determined that the northern leg of the US 64/NC 32 intersection is SR 1357 (Washington Street). Therefore, these two additional roads must be considered when the intersection combinations are developed.

# Intersection Study Example (Cont.)

Step C - Determine the intersection combinations

US 64 - WASHINGTON  
US 64 - SR 1357  
US 64 - NC 32  
NC 32 - WASHINGTON  
NC 32 - SR 1357

Step D - Calculate the AADT



# Intersection Study Example (Cont.)

Step E - Click on the “**New**” icon

Step F - Enter known study information

Step G - Go to the “Road Identification” tab

Step F

The screenshot shows the 'TEA Reports - Intersection Analysis' window. The 'Study Information' tab is selected. The 'Study Area' section contains the following fields:

Study Name	Location Text
JROMWASHUS64NC32	US 64 at NC 32
County: WASHINGTON	Division: 1
Municipality: All and Rural	
Y-Line Feet: 150	Begin Date: 01/01/1996
End Date: 12/31/1999	Years: 4
ADT: 21300	ADT Route:
K/A Coeff: 76.8	B/C Coeff: 8.4
Log No.:	PH No.:
TIP No.:	

The 'Request Information' section contains the following fields:

Received	Courier Service	Requested By
Phone:	Phone Ext.:	Fax:

The 'Last Update' section contains the following fields:

User ID	Date/Time
Jrom	18 July 2001 02:48 PM

The bottom of the window shows a navigation bar with '2 of 2' and navigation buttons.

# Intersection Study Example (Cont.)

Step I



TEAAS - Reports - Intersection Analysis

Edit Help

Study Information Road Identification Accident Adjustments

Log No.

**Generate Fiche** **Generate Study**

**Road 1 (Fiche Road)**

**Lookup** **Validate Codes/Names**

Table Input

**Submit**

Road Code	Road Name
30000032	NC 32
50032162	WASHINGTON
20000064	US 64
40001357	SR 1357

**Intersection Road Combinations**

**Lookup** **Validate Codes/Names**

Table Input

**Submit**

Road Name	Road Code	Road Code	Road Name
-----------	-----------	-----------	-----------

2 of 2

Step H

Step H - Enter the fiche roads

(All the roads that you want to look for crashes on)

Step I - Generate and save the fiche report

# Intersection Study Example (Cont.)

Step J - Enter all the road combinations

Step K - Generate the initial study

Step L - Save the list of Crash IDs (optional)

Step M - Save or print the initial study

Step N - Save your study

Step N

Step L

Step J

Step K

TEAAS - Reports - Intersection Analysis

Edit Help

Study Information Road Identification Accident Adjustments

Log No. [ ]

Generate Fiche Generate Study

Road 1 (Fiche Road)

Lookup Validate Codes/Names

Table Input

[ ] [ ] Submit

TEAAS - Crash Lists

☐ Save Crash ID List

☐ Save Detailed Crash ID List

OK

Intersection Road Combination

Lookup Validate Codes/Names

Table Input

[ ] [ ] [ ] [ ] Submit

Road Name	Road Code	Road Code	Road Name
US 64	20000064	30000032	NC 32
US 64	20000064	50032162	WASHINGTON
US 64	20000064	40001357	SR 1357
NC 32	30000032	50032162	WASHINGTON
NC 32	30000032	40001357	SR 1357

2 of 2

# Intersection Study Example (Cont.)

Step O - Compare the initial study with the fiche report to identify any crashes that need to be added or deleted. Individual crashes may need to be reviewed to make a more accurate decision.

## Crashes to be added

97068719

99106308

## Crashes to be deleted

96095531

98044473

98122774

98244134

99024746

99113754

*Note - this step may actually take a considerable amount of time depending on the number of identified crashes. For training purposes, only the results of this step are shown.*

# Intersection Study Example (Cont.)

Step P - Click on the “**Modify**” icon

Step Q - Go to the “Accident Adjustments” tab

Step P

Step Q

TEA Reports - Intersection Analysis

Edit Help

Study Information | Road Identification | **Accident Adjustments**

**Save As**

**Study Area**

Study Name: DTHARPEWASHUS64NC32 Location Text: US 64 at NC 32

County: WASHINGTON Division Municipality: 1 All and Rural

Y-Line Feet: 150 Begin Date: 01/01/1996 End Date: 12/31/1999 Years: 4

ADT: 19900 ADT Route: K/A Coeff.: 76.8 B/C Coeff.: 8.4

Log No.: PH No.: TIP No.:

**Request Information**

Received: Courier Service: Requested By:

Phone: Phone Ext.: Fax:

**Last Update**

User ID: jodtrain Date/Time: 15 November 2000 01:23 PM

1 of 1

# Intersection Study Example (Cont.)

Step R - Click the “**Generate Lists**” button

Step S - Highlight the crashes to be added in the “Fiche Minus Study Accidents List” then click the “**Include**” button

Step T - Highlight the crashes to be deleted in the “Study Accidents List” then click the “**Exclude**” button

Step U - Click the “**Generate Study**” button to run the final study

The screenshot shows the TEAAS - Reports - Intersection Analysis software interface. The interface is divided into several sections:

- Generate Lists** and **Generate Study** buttons are located at the top.
- Included Accidents** section: Contains a table with CrashID (97068735, 99066308) and a **Table Input** section with a **Submit** button. Below this is a text box explaining how to include additional accidents and an **Import List** button.
- Fiche Minus Study Accidents List** section: Contains a table with CrashID (99095308, 99097924, 99098624, 99099301, 99100078, 99105551, 99106308, 99106885, 99108886) and an **Include** button. An arrow points from Step S to this button.
- Study Accidents List** section: Contains a table with CrashID (99170205, 99170338, 99191287, 99227464, 99232141, 99248243, 99260120, 99263146) and an **Exclude** button. An arrow points from Step T to this button.
- Excluded Accidents** section: Contains a table with CrashID (98044473, 98122774, 98244134, 99024746, 99113754, 99227464, 99260120, 99263146).

Annotations:

- Step R** points to the **Generate Lists** button.
- Step U** points to the **Generate Study** button.
- Step S** points to the **Include** button in the **Fiche Minus Study Accidents List** section.
- Step T** points to the **Exclude** button in the **Study Accidents List** section.